FORAGE SUITABILITY GROUP
LIMY UPLAND

FSG No.: G063BY400SD

Major Land Resource Area: 63B - Southern Rolling Pierre Shale Plains

Physiographic Features
The soils in this group are found on upland slopes.

	Minimum	Maximum
Elevation (feet):	1300	2000
Slope (percent):	0	15
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very high

Climatic Features
This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 63B. Average annual precipitation for all climate stations listed below is about 22 inches. About 76 percent of the annual precipitation occurs during the months of April through September. On average, there are about 29 days with greater than .1 inches of precipitation during that same timeframe.

Average annual snowfall ranges from 19 inches at Creighton, Nebraska (NE,) to 44 inches at Winner, South Dakota (SD). Snow cover at depths greater than 1 inch range from 4 days at Stephan, SD, to 57 days at Winner.

Average July temperatures across the MLRA are about 76^0F and average January temperatures are about 17^0F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -37 and a high of 114 both recorded at Kennebec, SD. The MLRA lies in USDA Plant Hardiness Zones 4b and 5a.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data, access the National Water and Climate Center at http://www.wcc.nrcs.usda.gov.

			From	To
Freeze-free period (28 deg) (days):			128	152
(9 years in 10 at least)				
Last Killing Freeze in Spring (28 deg):			May 20	May 08
(1 year in 10 later than)				
Last Frost in Spring (32 deg):			Jun 09	May 17
(1 year in 10 later than)				
First Frost in Fall (32 deg):			Sep 01	Sep 21
(1 year in 10 earlier than)				
First Killing Freeze in Fall (28 deg):			Sep 19	Sep 30
(1 year in 10 earlier than)				
Length of Growing Season (32 deg) (days):			92	131
(9 years in 10 at least)				
Growing Degree Days (40 deg):			4526	5505
Growing Degree Days (50 deg):			2652	3257
Annual Minimum Temperature:			-25	-15
Mean annual precipitation (inches):	18	25		

Monthly precipitation (inches) and temperature (F):

2 years in 10:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Less Than	0.06	0.09	0.27	0.66	1.18	1.80	1.24	0.73	0.65	0.55	0.12	0.13
Precip. More Than	0.54	1.24	2.70	3.97	5.70	5.65	4.96	3.94	4.34	2.64	1.49	0.85
Monthly Average:	0.41	0.55	1.56	2.36	3.34	3.54	3.08	2.45	2.13	1.45	0.77	0.56
Temp. Min.	1.3	7.5	18.2	31.1	42.2	52.3	58.2	55.5	44.9	32.8	18.9	6.1
Temp. Max.	32.4	38.6	48.5	62.8	74.0	84.0	91.1	88.9	78.7	66.0	47.7	35.2
Temp. Avg.	18.7	24.4	34.9	48.5	59.6	69.5	75.7	73.5	63.2	51.1	35.2	22.4

Climate Station	Location	From	To
NE1990	Creighton, NE	1961	1990
NE1365	Butte, NE	1961	1990
SD9367	Winner, SD	1961	1990
SD0778	Bonesteel, SD	1961	1990
SD3452	Gregory, SD	1961	1990
SD7992	Stephan, SD	1961	1990
SD4516	Kennebec, SD	1961	1990

Soil Interpretations

These are moderately deep to very deep, well drained, medium to fine textured soils with elevated calcium carbonate levels near the soil surface. Permeability ranges from slow to moderate and available water capacities range from low to high.

Drainage Class:	Well drained	To	Well drained
Permeability Class: (0 - 40 inches)	Moderate	To	Very slow
Frost Action Class:	Low	To	Moderate

	Minimum	Maximum
Depth:	20	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent): (surface layer)	0.5	3.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	2
Sodium Absorption Ratio: (0 - 12 inches)	0	3
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.6	8.4
Available Water Capacity (inches): (0 - 60 inches)	3	11
Calcium Carbonate Equivalent (percent): (0 - 12 inches)	13	50

Adapted Species List

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed on the web at http://plants.usda.gov/.

Cool Season Grasses	Dryland	Irrigated
Crested wheatgrass	G	NS
Green needlegrass	F	NS
Intermediate wheatgrass	F	G
Meadow bromegrass	F	G
Newhy hybrid wheatgrass	F	NS
Orchardgrass	NS	G
Pubescent wheatgrass	G	G
Russian wildrye	F	NS
Smooth bromegrass	F	G
Western wheatgrass	G	NS

Warm Season Grasses	Dryland	Irrigated
Big bluestem	G	G
Indiangrass	F	G
Little bluestem	G	NS
Prairie sandreed	F	NS
Sideoats grama	G	NS
Switchgrass	F	G

Legumes	Dryland	Irrigated
Alfalfa	G	G
Birdsfoot trefoil	NS	G
Cicer milkvetch	G	F
Purple prairieclover	G	NS
Red clover	NS	G
White prairieclover	F	NS

G - Good adaptation for forage production on this group of soils in this MLRA
F - Fair adaptation but will not produce at its highest potential
NS - Species is not adapted to the site and should not be planted

Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

Forage Crop	Management Intensity		Management Intensity	
	High (lbs/ac)	Low (lbs/ac)	High (lbs/ac)	Low (lbs/ac)
Alfalfa	6900	3400		
Alfalfa/Intermediate wheatgrass	4000	2600	14300	8600
Alfalfa/Smooth bromegrass	4000	2600	14300	8600
Intermediate wheatgrass	4600	2900	11400	6900
Smooth bromegrass	4300	2900	11400	6900
Switchgrass	6300	3100		

Forage Growth Curves

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

Growth Curve Number: SD0001
Growth Curve Name: Alfalfa
Growth Curve Description: Alfalfa, MLRA's 107, 102B, 63B, 66, 65

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	30	25	20	15	5	0	0	0

Growth Curve Number: SD0004
Growth Curve Name: Cool season grass
Growth Curve Description: Cool season grass, statewide

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	40	30	10	5	5	0	0	0

Growth Curve Number: SD0005
Growth Curve Name: Warm season grass
Growth Curve Description: Warm season grass, statewide

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	40	35	15	0	0	0	0

Growth Curve Number: SD0003
Growth Curve Name: Irrigated Alfalfa
Growth Curve Description: Irrigated Alfalfa, state wide

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	25	20	15	10	0	0	0

Soil Limitations

The primary limitation to the soils in this group is the high lime content close to the soil surface. The lime reduces the availability of some plant nutrients. This reduces species choices and yield potential. Also, because most of these are sloping soils, they are subject to water and wind erosion, especially when establishing or renovating stands. They also tend to be droughty, especially those with lower available water capacity.

Management Interpretations

Selecting forage species that are tolerant of the high lime levels inherent to these soils, and also to droughty conditions can reduce their impact on yields. Including sod forming grass species in stands, especially on steeper slopes, will reduce the potential for sheet and rill erosion. Incorporate both wind and water erosion control practices during the establishment period. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, and evenly distribute grazing pressure.

FSG Documentation

Similar FSG's:

FSG ID	FSG Narrative
G063BY100S	Loamy soils do not have as high a lime content near the surface and are more productive.

Inventory Data References

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas
Natural Resources Conservation Service (NRCS) National Water and Climate Center data
USDA Plant Hardiness Zone Maps
National Soil Survey Information System (NASIS) for soil surveys in South Dakota and Nebraska counties in MLRA 63B
South Dakota and Nebraska NRCS Field Office Technical Guides
NRCS National Range and Pasture Handbook
Various South Dakota and Nebraska Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production

State Correlation

This site has been correlated with the following states: Nebraska and South Dakota

Forage Suitability Group Approval

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Original Date: 4/3/02
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Approval Date: 8/25/03